



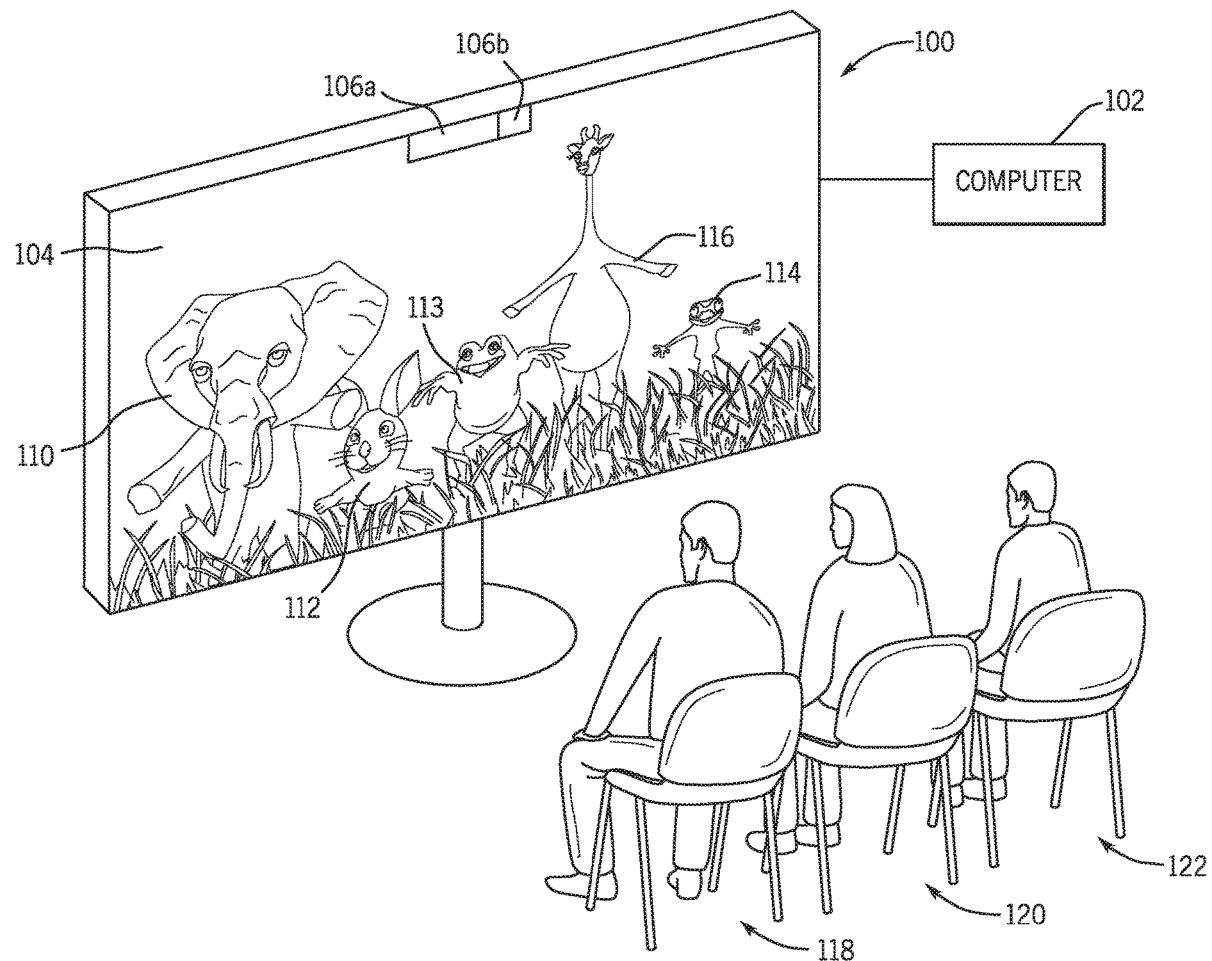
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(19) **United States**(12) **Patent Application Publication****Pan et al.**(10) **Pub. No.: US 2020/0294264 A1**(43) **Pub. Date: Sep. 17, 2020**(54) **GAZE BASED RENDERING FOR AUDIENCE ENGAGEMENT****G06F 3/01** (2006.01)**G06T 7/00** (2006.01)(71) Applicant: **Disney Enterprises, Inc.**, Burbank, CA (US)(52) **U.S. CL.**CPC **G06T 7/70** (2017.01); **G06T 7/248** (2017.01); **G06T 2207/20212** (2013.01); **G06T 7/97** (2017.01); **G06F 3/013** (2013.01)(72) Inventors: **Ye Pan**, Glendale, CA (US); **Kenny Mitchell**, Burbank, CA (US)(73) Assignee: **Disney Enterprises**(21) Appl. No.: **16/298,848**(22) Filed: **Mar. 11, 2019****Publication Classification**(51) **Int. CL.****G06T 7/70** (2006.01)**G06T 7/246** (2006.01)

(57)

ABSTRACT

The present disclosure is related to an audience engagement system and method to display images on a display. The method includes detecting a gaze direction of a designated viewer, rendering a gaze object within an image on a gaze axis corresponding to the gaze direction, rendering an audience object within the image on a normal axis corresponding to a display axis, compositing the audience object and the gaze object together in a composited image, and displaying the composited image on the display.



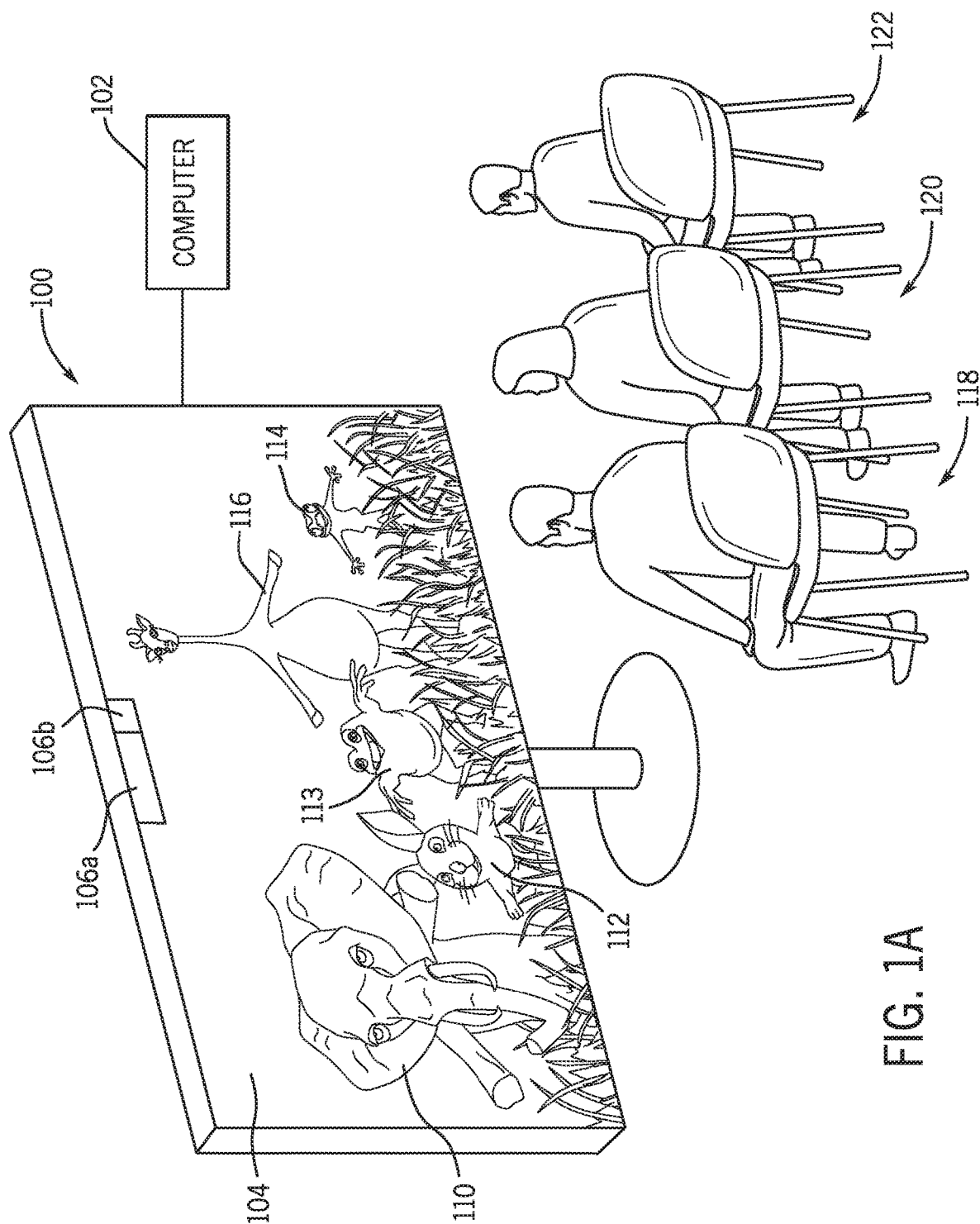


FIG. 1A

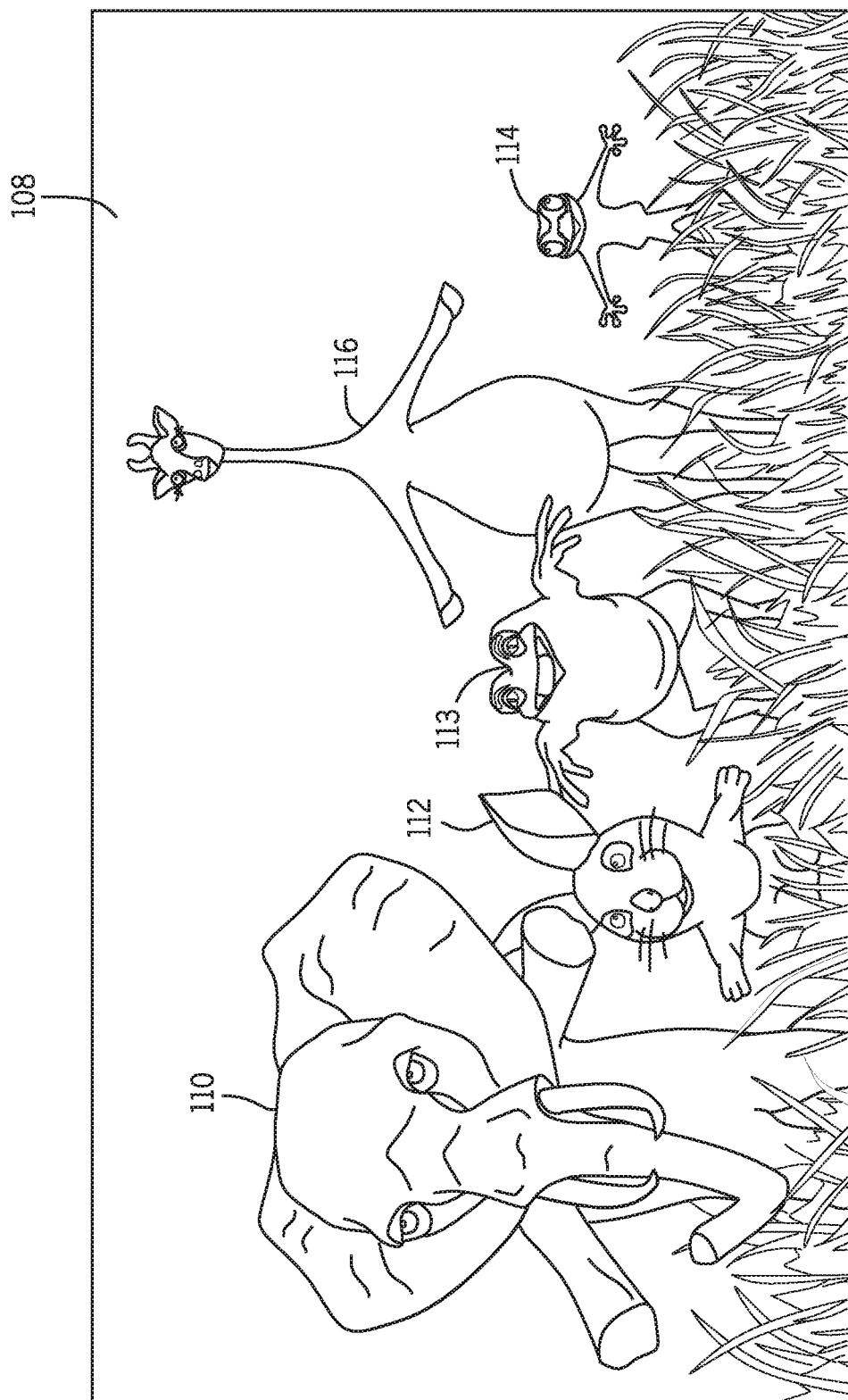
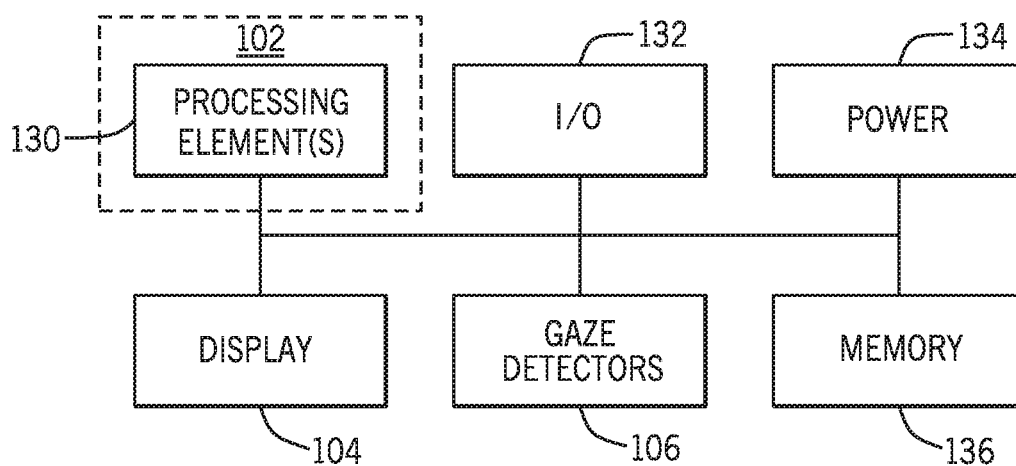
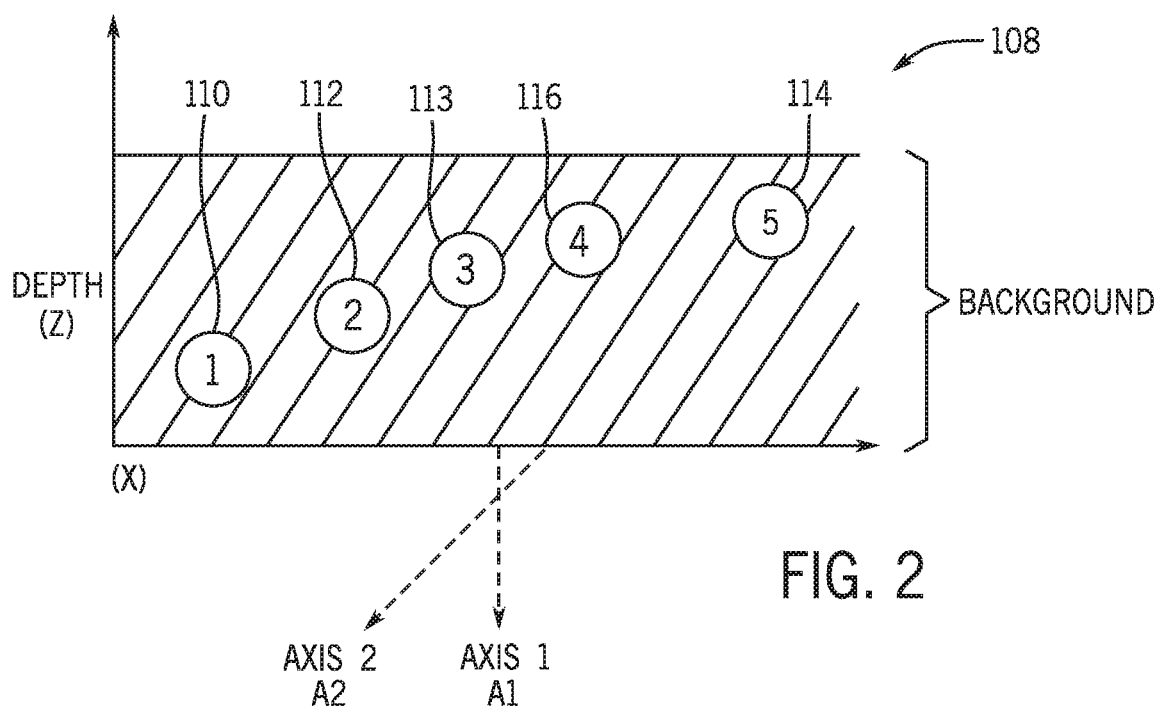


FIG. 1B



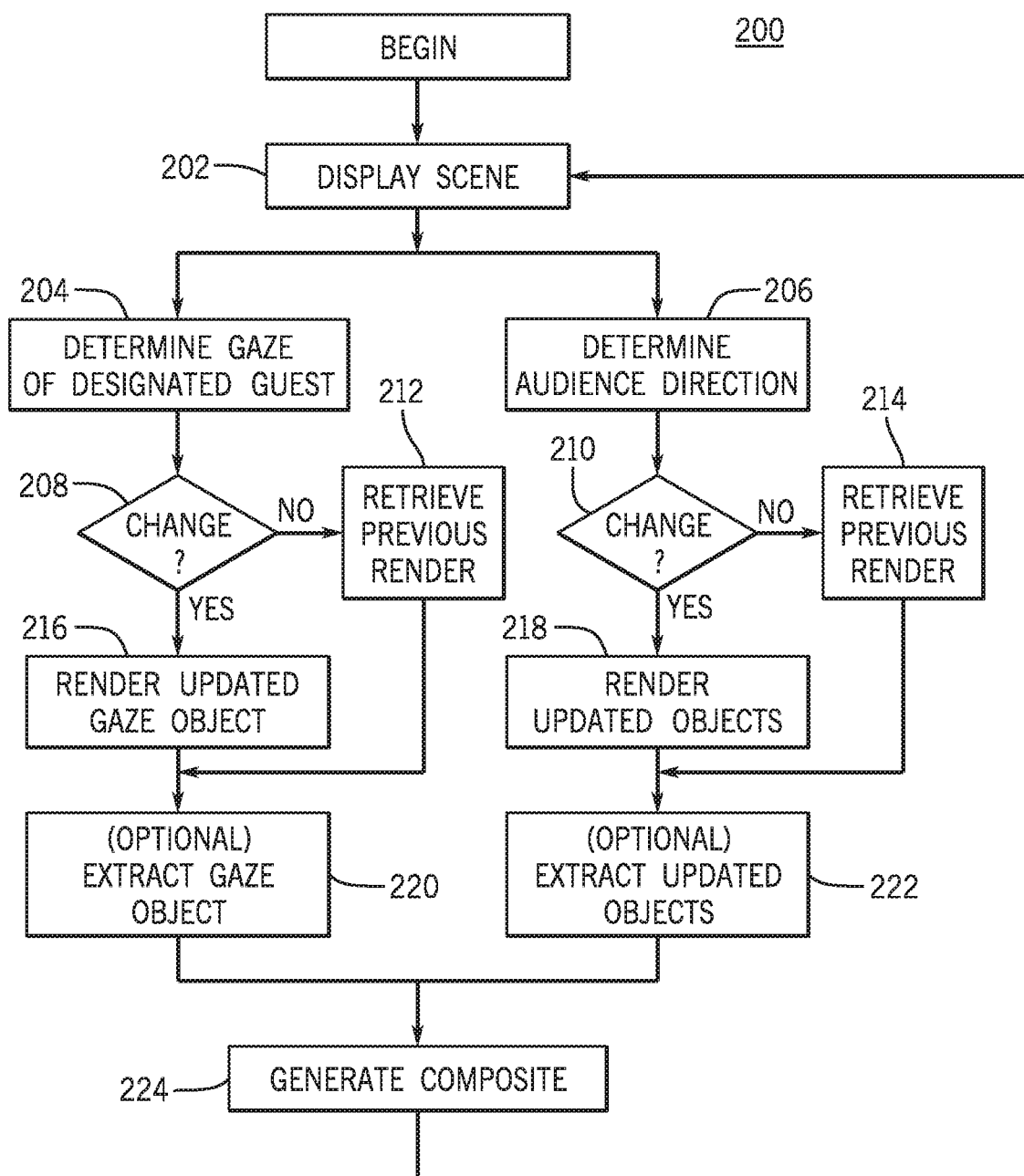


FIG. 4

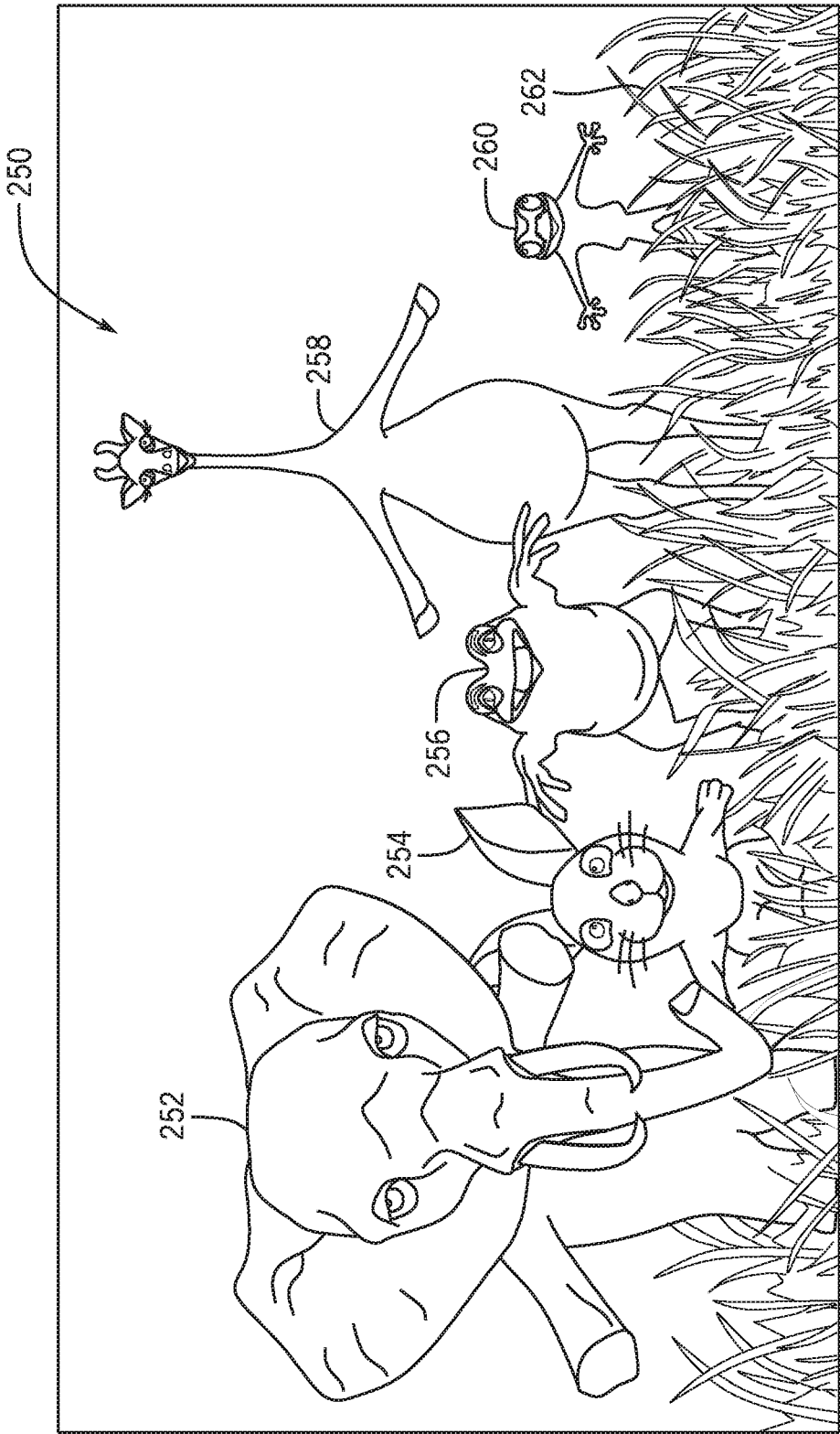


FIG. 5

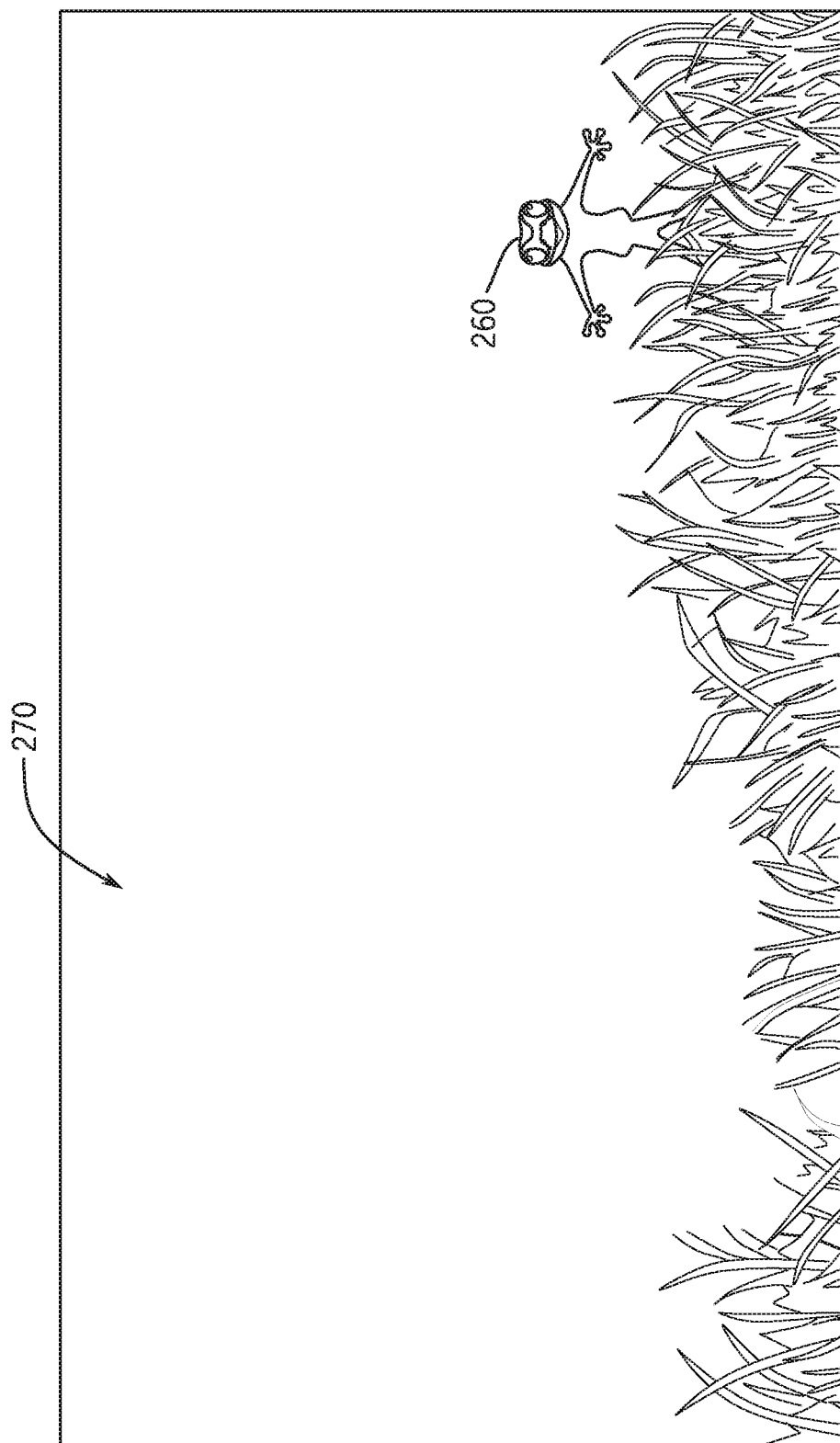


FIG. 6A

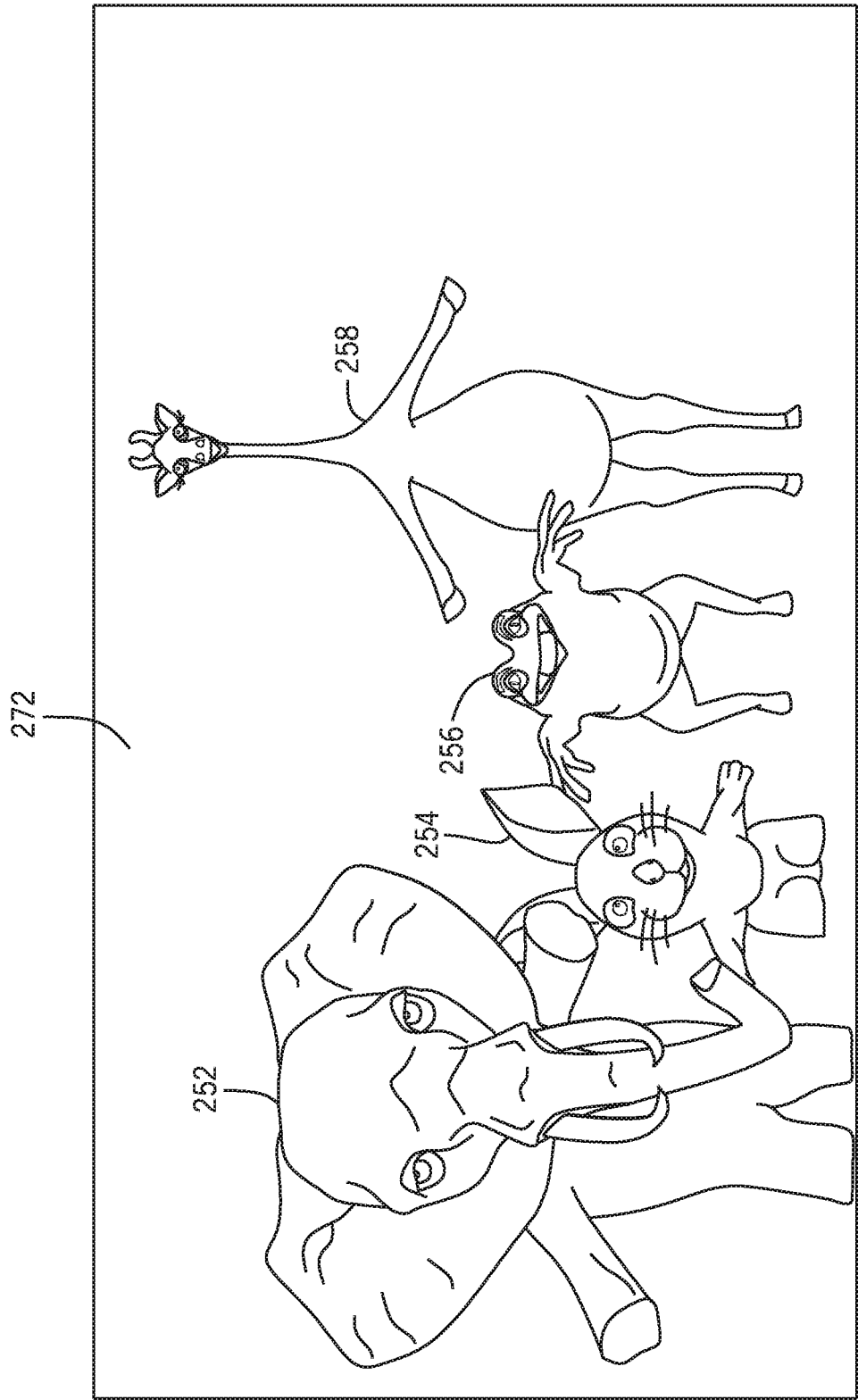


FIG. 6B

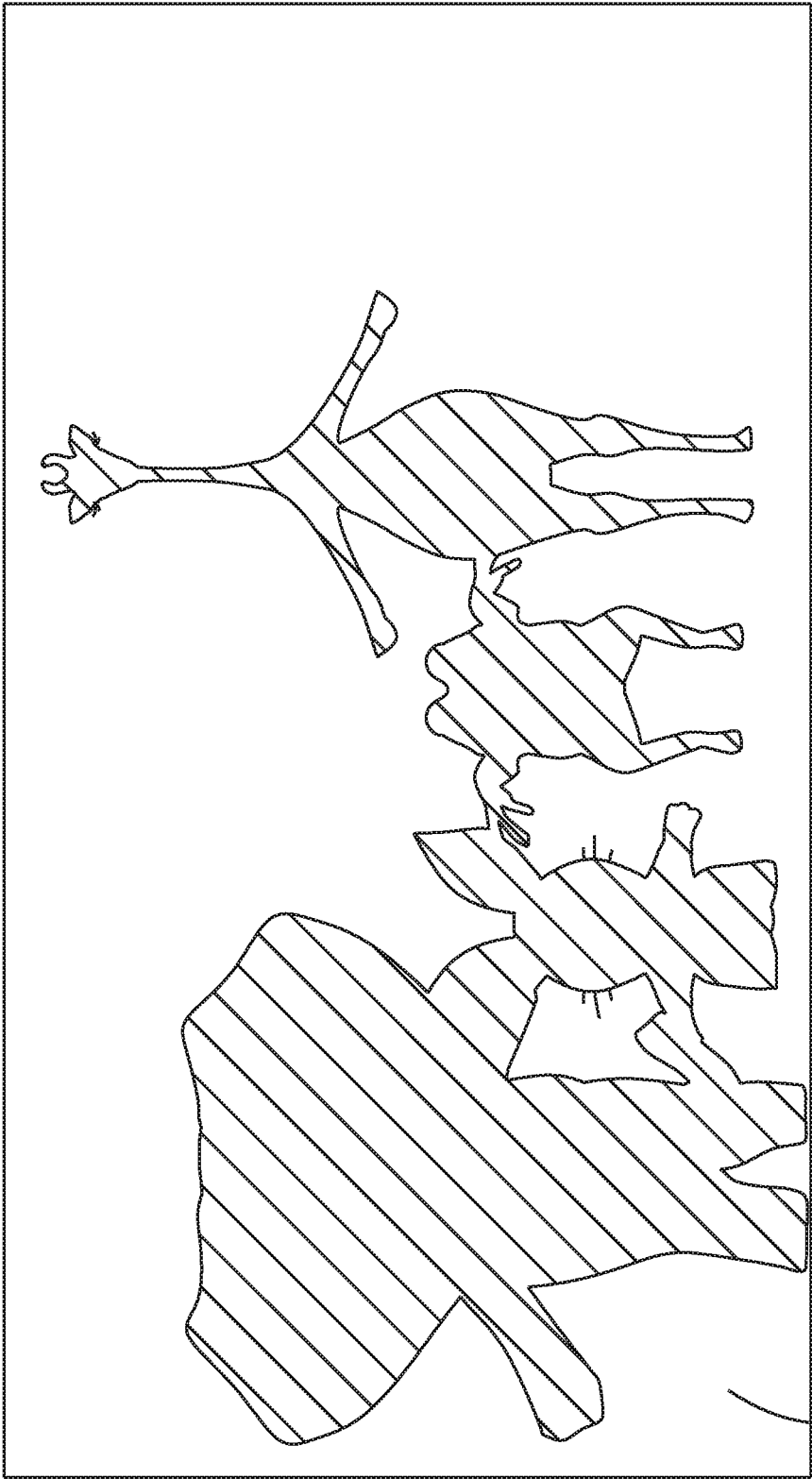


FIG. 6C

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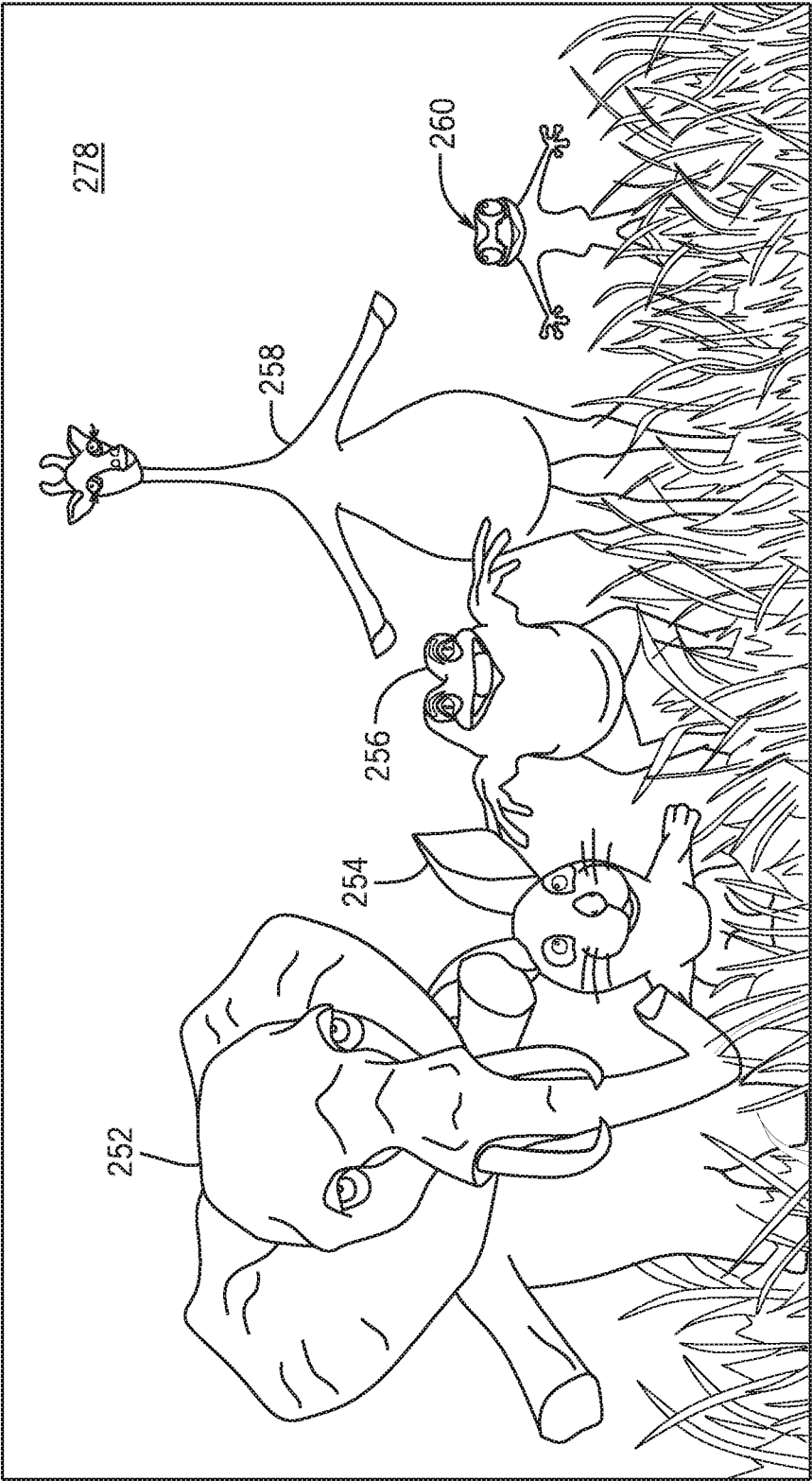


FIG. 7A

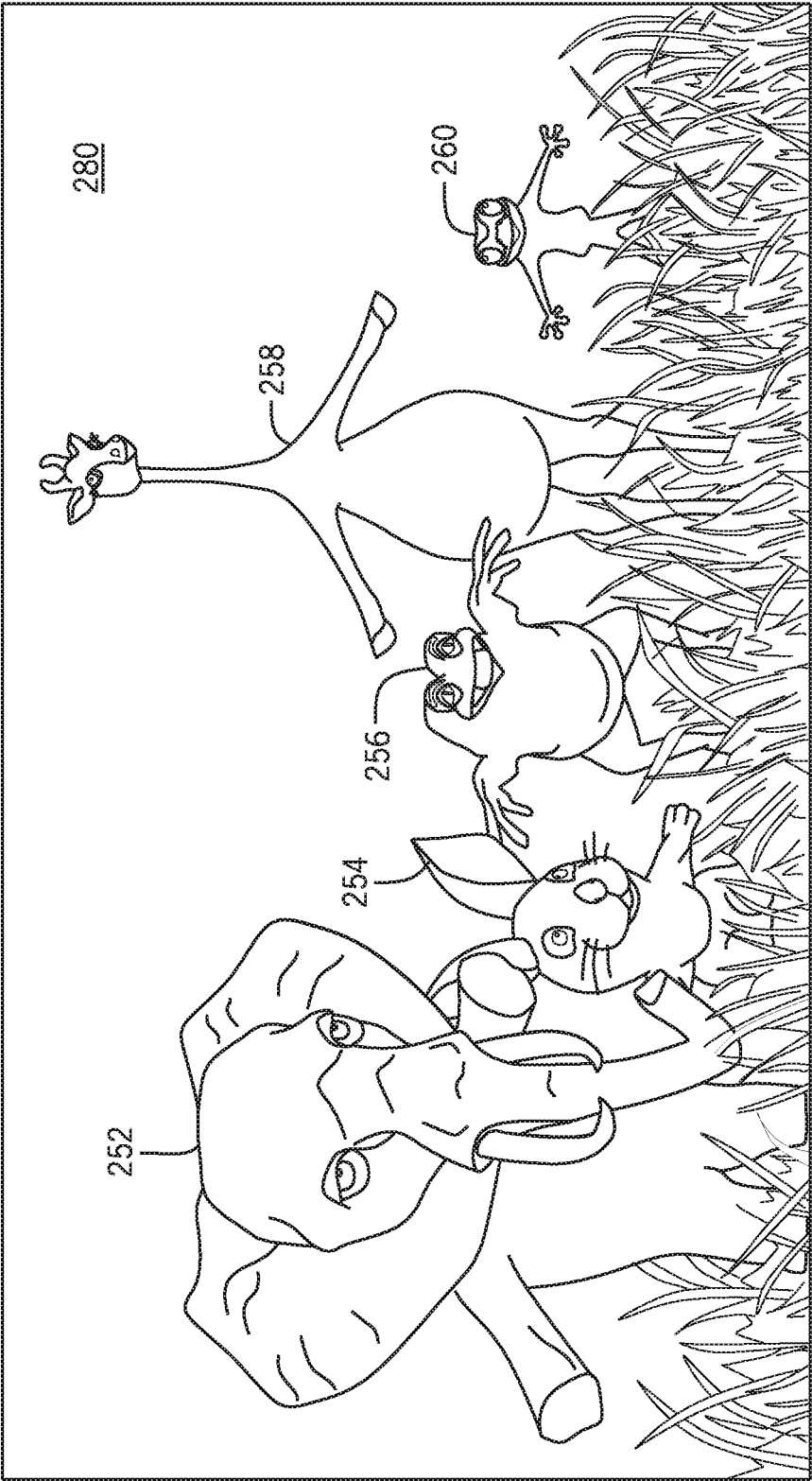


FIG. 7B

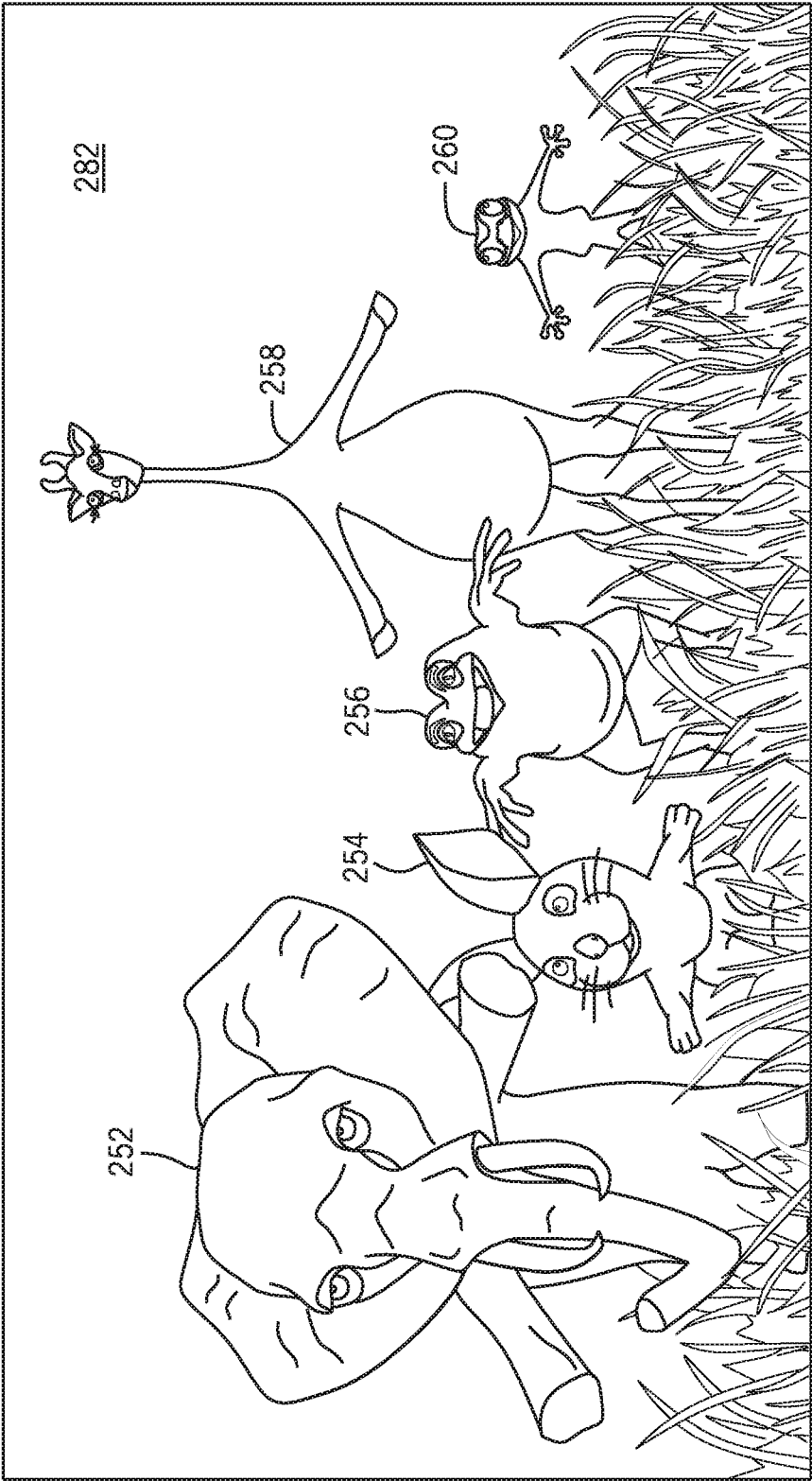


FIG. 7C

GAZE BASED RENDERING FOR AUDIENCE ENGAGEMENT

FIELD

[0001] The present disclosure relates generally to gaze based rendering of images.

BACKGROUND

[0002] Dynamic displays that display images or videos that interact with viewers are used in many environments, including amusement parks, advertisement displays, and entertainment venues. With two-dimensional displays, it is possible to include a character that appears to interact with the viewers, such as having eyes or other features that move to follow an animation. However, with current displays, the viewers of the display have the same view, so although there may be some viewer engagement, the engagement is shared by all viewers and not tailored to specific viewers. Additionally, flat monitors typically used with two dimensional displays can limit preservation of gaze direction due to the “Mona Lisa” effect, where the gaze of the character appears to follow a viewer regardless of viewpoint.

SUMMARY

[0003] According to one embodiment, an audience engagement system and method to display images on a display is disclosed. The method includes determining a gaze direction of a designated viewer, rendering a gaze object within an image on a gaze axis corresponding to the gaze direction, rendering an audience object within the image on a normal axis corresponding to a display axis, compositing the audience object and the gaze object together in a composited image, and displaying the composited image on the display.

[0004] According to another embodiment, an interactive display method to display images to a plurality of viewers is disclosed. The method includes determining a first gaze image of a gaze viewer of the plurality of viewers, utilizing the first gaze image to detect a gaze direction of the gaze viewer, rendering a first image object based on the gaze direction of the gaze viewer, wherein the first image object is rendered relative to a first axis, rendering a second image object relative to a second axis, combining the first image object and the second image object into an image frame, displaying the image frame on a display.

[0005] According to yet another embodiment, an image display system for audience engagement is disclosed. The system includes a display that generates visual images, a camera that captures images of audience members, and a computer in electronic communication with the display and the camera. The computer is configured to receive a designated member image, analyze the designated member image to determine a view direction of the designated member, receive a first image frame comprising a first group of objects corresponding to an audience view and a second group of objects corresponding to a designated view, render the first group of objects on a first axis, render the second group of objects based on a second axis corresponding to the view direction of the designated member, composite the first group of objects and the second group of objects into a composite image, transmit the composite image to the display.

[0006] In yet another embodiment, an image display method is disclosed. The method includes rendering by a processing element a first group of objects with a normal perspective, rendering a second group of objects with an anamorphic perspective, compositing by the processing element the first group of objects and the second group of objects into a composite image, and transmitting by the processing element the composite image to a display.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1A is a perspective view of a system for generating interactive images rendered from two perspectives.

[0008] FIG. 1B is an elevation view of an interactive image used in the system of FIG. 1A.

[0009] FIG. 2 is a schematic diagram of a depth and axis orientation for objects within the interactive image of FIG. 1B.

[0010] FIG. 3 is a block diagram of the system of FIG. 1A.

[0011] FIG. 4 is a flow chart illustrating a method of to generate composite images for display with the system of FIG. 1A.

[0012] FIG. 5 is a first or initial composite image generated via the method of FIG. 4.

[0013] FIG. 6A is a gaze object image with the gaze object rendered on a gaze axis.

[0014] FIG. 6B is an audience object image with the audience objects rendered on a normal or audience axis.

[0015] FIG. 6C is a masking image to mask the object images in FIG. 6B.

[0016] FIG. 7A is a first example of a composite image including gaze objects and audience objects with a first gaze viewpoint.

[0017] FIG. 7B is a second example of the composite image including gaze objects and audience objects with a second gaze viewpoint.

[0018] FIG. 7C is a third example of the composite image including gaze objects and audience objects with a third gaze viewpoint.

SPECIFICATION

[0019] The present disclosure is related to a system and methods to generate interactive and viewer engaging displays. In one example, an image including two or more characters or objects is rendered from two different perspectives, such as from a normal perspective and an off-axis perspective, where the off-axis perspective is based on a gaze direction of a designated viewer. To select the off-axis perspective, the gaze direction of the designated viewer is detected or otherwise determined and used to update the rendering axis. After the off-axis character or object has been rendered, a composite image is generated, overlaying the normal axis characters or objects together with the off-axis character or object. This composited image provides a more complete viewer engagement experience than conventional displays, since the normal axis characters may be rendered to include features, such as tracking eyes, turning heads, or the like, that engage a group of viewers, while the off-axis character gaze character is rendered to more fully engage with a selected viewer. In this manner, multiple viewers can engage with different objects or characters in a scene.

[0020] FIG. 1A illustrates an example of a system 100 for displaying individualized gaze engagement images to two or

more viewers **116**, **118**, **120**. FIG. 1B illustrates an example of an composite image **108** generated by the display. The system **100** includes a computer **102**, a display **104**, and one or more gaze detectors **106**. The display **104** generates images **108** that may include two or more objects **110**, **112**, **113**, **114**, **116** defining subjects or characters within the scene of the image, the scene may include background or other scenic elements, such as the grass shown in FIG. 1A. In this example, at least one object, such as object **114**, is selected to vary its rendering axis or perspective based on the gaze direction of at least one viewer **118**, **120**, **122**, such as a designated viewer **118**. The remaining subjects **110**, **112**, **113**, **116** may be rendered on a normal axis, regardless of the gaze of the designated viewer **118**, but may engage and follow the gaze of the other viewers **120**, **122**, but without changing the rendering axis. In this manner, the designated or gaze character **114** may be generated with a dynamic anamorphosis that adapts to the changing position of the viewer **118**, such that as the designated viewer **118** changes gaze direction or moves relative to the display **104**, the gaze subject **114** may remain undeformed. In this example, the designated viewer **118** will continue to see the same image, regardless of the user's viewpoint of the image **108**, whereas the remaining viewers **120**, **122** will see deformed images of the subjects **110**, **112**, **113**, **114**, **116**. In this manner, the gaze subject **114** may be anamorphic where the character's distortion depends on the viewpoint and the gaze subject **114** dynamically adapts to the changing position of the designated viewer **118**.

[0021] FIG. 2 illustrates a schematic view of the composite image **108**. As shown in FIG. 2, the image **108** includes the subjects or objects **110**, **112**, **113**, **114**, **116** optionally positioned at different z or depth locations within the image **108** with optionally a background or other scene aspects extending around, ahead of, and behind the subjects **110**, **112**, **113**, **114**, **116**. In this example, a first group of subjects **110**, **112**, **113**, **116** is rendered relative to a first axis **A1** perspective, which in one example is normal or perpendicular relative to a front face of the display **104** or an x axis for the image. The second group of subjects, gaze subject **114**, is rendered relative to a second axis **A2** perspective. The second axis **A2** may at times be normal to the display and parallel to the first axis **A1**, but is variable based on a viewer gaze, and changes to be off-axis or otherwise non-normal and not parallel to the first axis **A1**, e.g., at an angle relative to the first axis.

[0022] FIG. 3 illustrates a block diagram of the system **100**, including the computer **102**, the display **104**, and the gaze detector **106**. Additionally, the system **100** may include one or more processing elements **130** that may be incorporated into the computer **102**, display **104**, or other elements, memory components **136**, an input/output interface **132**, and a power source **134**.

[0023] The processing element **130** is substantially any electronic device capable of processing, receiving, and/or transmitting instructions, including one or more graphics processing units, servers, processors, or the like. The memory **136** stores electronic data used by the computer **102**, processing element **130**, and display **104**. The input/output interface **132** provides communication to and from the display **104**, the gaze detector **106**, and/or computer **102**, as well as other devices. The input/output interface **132** can include one or more input buttons, a communication interface, such as WiFi, Ethernet, or the like, as well as other

communication components such as universal serial bus (USB) cables, or the like. The power source **134** may be a battery, power cord, or other element configured to transmit power to the components of the projectors.

[0024] The display **104** is substantially any type of device that can generate visual outputs, such as a liquid crystal display, organize light emitting diode display, and the like. In many embodiments, the display **104** may be a two-dimensional display with a flat projection surface, but in other examples, the display **104** may be curved, non-planar, or the like. Additionally, the display **104** could be a projected image display on a projection surface, where the projection surface may be a solid surface (e.g., wall), flexible, deforming, movable, or otherwise non-solid surface, e.g., water, rubber, or the like.

[0025] The gaze detector **106** may include one more devices capable of detecting viewer characteristics that correspond to a gaze direction, e.g., head position, eye direction, head movement, eye movement, viewer accessories (e.g., hats, glasses, hair), and the like. One example of gaze detection that can be used is found in U.S. Pat. No. 9,424,467 entitled "Gaze Tracking and Recognition with Image Location," which is incorporated by reference for all purposes herein. In some instances the gaze detector **106** may determine a position of a viewer's face and use the face orientation and eye level to estimate a gaze direction. In some embodiments, the gaze detector **106** may include one or more cameras that capture images of the viewer **118**, which may then be analyzed by the processing element **130** to determine a gaze direction of the designated viewer **118**. In some embodiments, the gaze detector may detect features or aspects that can be correlated or otherwise used to estimate a viewer's gaze. For example, if the system **100** is used in an amusement park, the display or the viewer's seat may be movable. In this example, the position of the viewer's seat or the display, which may be determined by a position detector or via known choreography, can be used to approximate the viewer's gaze. In other words, since the position of the seat is known and changes relative to the display, it can be assumed that the viewer's gaze will change as the seat changes. In this example, the gaze detector will determine the position of the seat or other movable element and translate that into a gaze direction.

[0026] Additionally, the gaze detector **106** may include a separate camera or other sensor that detects gaze features of the remaining viewers **120**, **122**. For example, images of the remaining non-designated viewers **120**, **122** may be captured and used to determine gestures, gaze, and the like that determine a gaze direction or perspective. In one embodiment, the gaze detector **106** is used to determine a designated gaze perspective (e.g., the gaze direction of the designated viewer **118**) and a normal gaze perspective (e.g., the gaze direction of the remaining viewers **120**, **122**). In another example, the system may not track the gaze of the non-designated viewers, but rather rely on an animation to change the content or determine a position based on movement within a venue (e.g., ride or seat movement) to determine an audience viewpoint.

[0027] FIG. 4 illustrates a method of using the system **100** of FIG. 1A to display images including a designated viewpoint object or objects and an audience viewpoint object or object. The method **200** may begin with operation **202** and an initial scene image **108** is displayed on the display **104**. FIG. 5 illustrates an initial scene image **250** including

multiple objects **252, 254, 256, 258, 260** rendered within a background **262** or other scenic elements. Of the objects **252, 254, 258, 260**, there may be two groups, a designated or gaze object **260** group and audience object **252, 254, 256, 258** group.

[0028] As the initial image **250** is displayed, the method **200** proceeds to operations **204** and **206**, which may be executed in parallel or in series to one another. In operation **204**, the gaze detector **106a** captures images of the designated viewer **118** or group of designated viewers **118**, which may then be analyzed by the processing element **130** to determine a gaze direction. For example, the captured images may be analyzed to determine facial features, gestures, or the like, in order to determine a head direction, eye direction, and the like. In some embodiments, there may be two or more designated viewers **118**, where the viewers may be arranged sufficiently close together, such as within a threshold viewpoint cone angle, such that the gaze object may engage with two selected viewers simultaneously. It should be noted that operation **204** may not directly detect gaze, but detect or determine positions of other objects or elements that can be used to approximate gaze, e.g., a seat location for the viewer, a ride location, detect viewer accessories or related elements, that may then be used to approximate gaze.

[0029] In operation **206**, the gaze detector **106b** captures images of the audience **120, 122**, such as representative audience members or other features, to determine an audience direction, such as a direction a majority of the audience members are facing or looking. It should be noted that operations **204** and **206** may be completed in parallel or in series, depending on the system **100** components. In particular, in some embodiments, the system **100** includes a first gaze detector **106a** and a second gaze detector **106b**, where the gaze detectors **106a, 106b** may simultaneously (or substantially simultaneously) capture images of the designated viewer **118** and the audience viewers **120, 122**, respectively. Alternatively, a single gaze detector **106** may be used to serially capture images of the designated viewer **118** and the audience members **120, 122**. In other examples, the audience viewpoints may not be captured or detected and rather the audience may engage with a predetermined animation or the like. Alternatively, the audience viewpoint may be determined based on a ride position, e.g., movement of a ride relative to a screen and therefore may not directly detect the audience viewing direction.

[0030] With reference again to FIG. 4, after operations **204, 206**, the method **200** may proceed to operations **208, 210**, respectively. In both operations **208, 210** the processing element **130** analyzes the captured viewer images (e.g., designated viewer image and audience image) to determine if the detected gaze direction or audience direction has changed. In operation **208**, the processing element **130** or computer may compare the last determined gaze direction to a new determined gaze direction to determine whether there has been a change over a threshold. In this example, small incremental changes in a gaze direction may be disregarded to expedite processing of the system. For example, the system may compare a current gaze determine to a past gaze detection and determine whether the change in degrees is sufficiently high to render new content. By requiring a higher threshold change, the viewer rendered object and image may appear more stable than with lower thresholds, but the lower the threshold the more engaging and interac-

tive the image may appear. However, in other examples, most changes in gaze direction may be determined as a sufficiently large change, to have a more responsive system **100**.

[0031] In operation **210**, the processing element **130** analyzes images captured of the audience to determine whether there has been any changes in audience direction. This may be a similar process to operation **208**, but may be done for a representative audience viewer or multiple audience viewers, with an average direction determined. In other embodiments, the audience direction may be predetermined and/or may not be detected.

[0032] If in operation **208**, there has been a change in the gaze direction of the designated or gaze viewer **118**, the method **200** proceeds to operation **216** and an updated version of the gaze object **260** is rendered. In particular, the processing element **130** uses the designated viewer's **118** gaze direction to select the rendering axis **A2** for the gaze character **260**. Using the rendering axis **A2**, which is selected to be normal to the gaze direction of the designated viewer **118**, rather than the display **104** plane, the gaze object **260** is anamorphically deformed to be adjusted to the gaze direction of the designated user. This may change the orientation of the gaze object **260** within the scene such that the object will be aligned to the gaze direction of the designated viewer **118**. FIG. 6A illustrates an example of the gaze rendered image **270** including the gaze object **260** being rendered to be aligned with the gaze directional axis **A2**, such that from the perspective of the designated viewer **118**, the gaze object **260** may appear as undeformed.

[0033] If in operation **208**, there has been no change in the gaze direction, the method **200** may proceed to operation **212** and the processing element **130** may retrieve the previous version of the rendered gaze object **260**, e.g., object from previous image or frame.

[0034] After operations **212** or **216**, the method **200** may optionally proceed to operation **220** and the gaze object **260** may be extracted or otherwise prepared to be integrated with the audience objects. In some embodiments, operation **220** may be omitted and the scenic elements or background may be in the same frame rendered with the gaze objects **260**, such that the audience objects **252, 254, 256, 258** may be added to the rendered image of the gaze object **260** and thus operation **220** may be omitted. However, in other embodiments, the audience objects may be rendered with the scenic or background elements or the background elements may be rendered separately from the objects, and as such, both the audience and gaze objects will be extracted to be overlaid together. In instances where the gaze object **260** is to be imported into another image, the gaze object **260** may be extracted. For example, an extraction mask may be used to define the perimeter of the gaze object **260** and distinguish the gaze object **260** from other elements within the rendered frame. Using the defined perimeter or mask, the gaze object **260** as-rendered will be removed to be inserted into the final image. Conventional extraction or masking techniques, such as chroma key compositing techniques or other masking techniques that can be used to identify selected pixels for masking may be used to identify pixels corresponding to a particular object or character.

[0035] With reference again to FIG. 4, if in operation **210**, there has been a change in the audience perspective, the method **200** may proceed to render the audience objects **252,**

254, 256, 258. In many embodiments, the audience objects **252, 254, 256, 258** may be rendered from the normal axis **A1** regardless of the gaze direction, but may be varied or deform to match the gaze direction. For example, as shown in FIG. 6B, in an example of the audience rendered image **272**, the audience characters **252, 254, 256, 258** may be rendered so as to “follow” the audience direction, which because they are rendered from the normal axis **A1**, causes the heads and eyes to turn or otherwise deform.

[0036] If in operation **210** there has not been a change or the change does not meet a determined threshold, the method **200** may proceed to operation **214** and the processing elements **130** may retrieve a previous rendered version of the audience objects **252, 254, 256, 258**, such as from memory **136**.

[0037] After operations **214, 218**, the method **200** may proceed to operation **222** and the audience objects **252, 254, 256, 258** may be extracted or otherwise prepared to be overlaid with the gaze object **260**. FIG. 6C illustrates an example of an extraction mask **274** used to extract the audience objects **252, 254, 256, 258** from the rendered frame. As shown in FIG. 6C, a chroma keying technique having a solid background in the rendered image **272**, is used to separate out or define a mask corresponding to the audience objects **252, 254, 256, 258**. In this example, the background for the rendered image for the audience objects may be selected to more easily allow the objects to be masked and extracted, e.g., a solid colored background such as blue, green, or black background. Other extraction and image compositing techniques may be used as well.

[0038] It should be noted that in embodiments where the audience objects **252, 254, 256, 258** are rendered with the background elements, operation **222** may be omitted, since the gaze object **260** may be overlaid into the audience rendered image. Alternatively, as noted above, in some instances, the audience and gaze objects may be rendered separately from each other and the background elements, and then the background and objects combined together and in these embodiments both operations **220, 222** may be completed to extract the respective objects.

[0039] With reference again to FIG. 4, after operations **220, 222**, the method **200** proceeds to operation **224** and the final composited image is generated. For example, the processing elements **130** may combine the updated gaze object **260**, the updated audience objects **252, 254, 256, 258**, and the background elements (which may be rendered with one of the object groups) into a single image frame. In one embodiment, the gaze object **260** is rendered with the background as shown in image **270** and in this embodiment, the audience objects **252, 254, 256, 258** are extracted via the mask shown in image **274** and layered into the image **270** to generate a final image. In another embodiment, the audience objects **252, 254, 256, 258** are rendered with the background and the updated gaze object **260** is masked via operation **220** and layered into the rendered audience frame. In various embodiments, the objects are combined together to generate the final image. In some instances, the objects may be positioned at different depth locations in the image (see e.g., FIG. 2). In these embodiments, the varying depth locations allow the deformed aspects of the objects to not substantially interfere with one another, especially given the gaze object is rendered relative to a different axis from the other objects

in the scene. In some instances, a master virtual camera may be used to determine the ordering and layering of objects within the image frame.

[0040] In some instances, especially where the gaze object is a scenic element, rather than a character, the compositing may include a transition section or transition object that transitions between the gaze axis and the normal axis for the scenic and/or objects, i.e., is rendered from a transition perspective that falls between the gaze and audience perspectives. In these instances, the content falling between the gaze axis rendering and the normal axis rendering will be incremented or smoothed to be rendered along one or more scenic axes falling between the gaze axis and the normal axis. In other words, the final image may include multiple rendering axes, with the first object rendered from a gaze axis, the second object rendered from a normal axis, and objects, background, or other elements, rendered from one or more axis directions falling between the gaze axis and the normal axis, where the variable axis directions approach the gaze direction on one end and the normal axis on another end.

[0041] After the image has been rendered, the method **200** may return to operation **202** and the new rendered image or scene may be displayed by the display **104**.

[0042] The method **200** allows different types of user engagement with a display **104**. FIGS. 7A-7C illustrate various images generated using the method **200** that demonstrate the gaze character **260** continuing to be rendered based on the gaze direction of the designated viewer **118**, such that the gaze character **260** appears to be undeformed regardless of the viewing angle or perspective of the designated viewer **118**. In this example, as the viewer **118** continues to focus on different locations of the scene or walk to different locations relative to the display **104**, such as to the right or left sides of the display **104**. As the designated viewer **118** changes locations or gaze directions, the gaze character **260** will be adjusted such that the designated viewer **118** will view the character **260** consistently across all viewing angles. This is in contrast to the audience characters **252, 254, 256, 258** that are rendered from the same perspective in all frame, such that to vary the engagement with the audience based on different viewpoints, the audience objects will deform as shown in FIGS. 7A-7C as compared to FIG. 6, where the objects have their eyes and heads turned and deformed to meet an audience gaze direction.

[0043] It should be noted that the techniques described herein may be used with display effects, such as reflected, refracted, projected displays (e.g., Pepper's ghost techniques) that allow the projected object to maintain viewer engagement as the viewer changes positions, etc.

Conclusion

[0044] The methods and systems are described herein with reference to two dimensional displays. However, these techniques are equally applicable to other types of displays and display environments, such as three dimensional displays. With three dimensional displays, the objects may be rendered in a volumetric manner to give the appearance of depth and optionally two or more depth images (e.g., right eye and left eye) may be generated with the objects rendered from the determined axis. Additionally, while the rendering aspects have been discussed with respect to objects, in some

instances, the techniques may be used to modify lighting and the like based on viewpoint to allow a more integrated engagement experience.

[0045] In methodologies directly or indirectly set forth herein, various steps and operations are described in one possible order of operation but those skilled in the art will recognize the steps and operation may be rearranged, replaced or eliminated without necessarily departing from the spirit and scope of the present invention. It is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative only and not limiting. Changes in detail or structure may be made without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. An audience engagement method to display images on a display comprising:

- determining a gaze direction of a designated viewer;
- rendering a gaze object within an image on a gaze axis corresponding to the gaze direction;
- rendering an audience object within the image on a normal axis corresponding to a display axis;
- compositing the audience object and the gaze object together to generate a composited image; and
- displaying the composited image on the display.

2. The method of claim 1, wherein the gaze display axis varies based on variations of the gaze direction of the designated viewer.

3. The method of claim 1, further comprising extracting the audience object from a rendered image, wherein the extracted audience object is composited into the composited image.

4. The method of claim 1, further comprising detecting an audience direction corresponding to an audience viewing direction of one or more audience viewers.

5. The method of claim 4, wherein the audience object is rendered to take into account the audience viewing direction.

6. The method of claim 5, wherein the audience object is deformed on the normal axis to take into account the audience viewing direction.

7. The method of claim 1, wherein the gaze axis is not parallel to the normal axis.

8. The method of claim 1, further comprising rendering a scenic object relative to a scenic axis, wherein the scenic object is positioned between the gaze object and the audience object and the scenic axis is between the normal axes and the gaze axis.

9. An interactive display method to display images to a plurality of viewers, the method comprising:

- determining a first gaze image of a gaze viewer of the plurality of viewers;
- utilizing the first gaze image to detect a gaze direction of the gaze viewer;
- rendering a first image object based on the gaze direction of the gaze viewer, wherein the first image object is rendered relative to a first axis;
- rendering a second image object relative to a second axis; and
- combining the first image object and the second image object into an image frame; and
- displaying the image frame on a display.

10. The interactive display method of claim 9, wherein the first axis and the second axis are not parallel to one another.

11. The interactive display method of claim 9, wherein the second axis is fixed and the first axis is variable based on the gaze direction of the gaze viewer.

12. The interactive display method of claim 9, further comprising:

- masking the second image object; and
- combining the first image object and the second image object includes overlaying the second image object into an image including the gaze object to generate the image frame.

13. The interactive display method of claim 9, wherein detecting the gaze direction comprises analyzing the first gaze image for at least one of a head position, an eye position, or a body gesture.

14. The interactive display method of claim 9, further comprising:

- capturing a second gaze image of the gaze viewer;
- utilizing the second gaze image to detect an updated direction of the gaze viewer;
- rendering the first image object based on the updated gaze direction of the gaze viewer, wherein the first image object is rendered relative to an updated position of the first axis, wherein the updated axis position corresponds to the updated gaze direction of the gaze viewer;
- combining the updated first image object with the second image object into an updated image frame; and
- displaying the updated image frame.

15. An image display system for audience engagement comprising:

- a display that generates visual images;
- a camera that captures images of audience members; and
- a computer in electronic communication with the display and the camera, wherein the camera is configured to:
 - receive a designated member image;
 - analyze the designated member image to determine a view direction of the designated member;
 - receive a first image frame comprising a first group of objects corresponding to an audience view and a second group of objects corresponding to a designated view;
 - render the first group of objects on a first axis;
 - render the second group of objects based on a second axis corresponding to the view direction of the designated member;
 - composite the first group of objects and the second group of objects into a composite image; and
 - transmit the composite image to the display.

16. The image display system of claim 15, wherein the display is a two-dimensional display.

17. The image display system of claim 15, wherein the first axis and the second axis are defined at an angle relative to one another.

18. An image display method, comprising:

- rendering by a processing elements a first group of objects with a normal perspective;
- rendering by the processing element a second group of objects with an anamorphic perspective;
- compositing by the processing element the first group of objects and the second group of objects into a composite image; and
- transmitting by the processing element the composite image to a display.

19. The image display method of claim **18**, further comprising rendering by the processing element a transition object from a transition perspective, wherein the transition perspective is between the normal perspective and the anamorphic perspective.

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